



Spring Shadows  
CIVIC ASSOCIATION

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# 2019 MOSQUITO CONTROL

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Mitigating the nuisance and health risks related to  
the mosquito population in Spring Shadows

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**Prepared for**

Spring Shadows Civic Association  
Board of Directors

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**Prepared by**

The Health & Mosquito Committee  
Chaired by: David Jurgens

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**Issued January 2019**

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# **PART I. BACKGROUND**

PART I. BACKGROUND

# Committee Objectives

**PURPOSE**

**As residents of Houston, we share our beautiful neighborhood with mosquitos – a known nuisance and potential health hazard. The Health & Mosquito Committee aims to mitigate this problem through a homeowner education program and treatment methods that will reduce the mosquito population.**



**SCOPE**

The committee has been tasked with the following:

1. Develop an education plan to encourage and support homeowner responsibility
2. Present science-based solutions that SSCA can reasonably afford to reduce the mosquito population

Solutions need to address the mosquito season between April and October.

Solutions need to target the Aedes Aegypti and Culex mosquito species.

Solutions need to be within the approved board budget of \$20,000.



**OBJECTIVE**

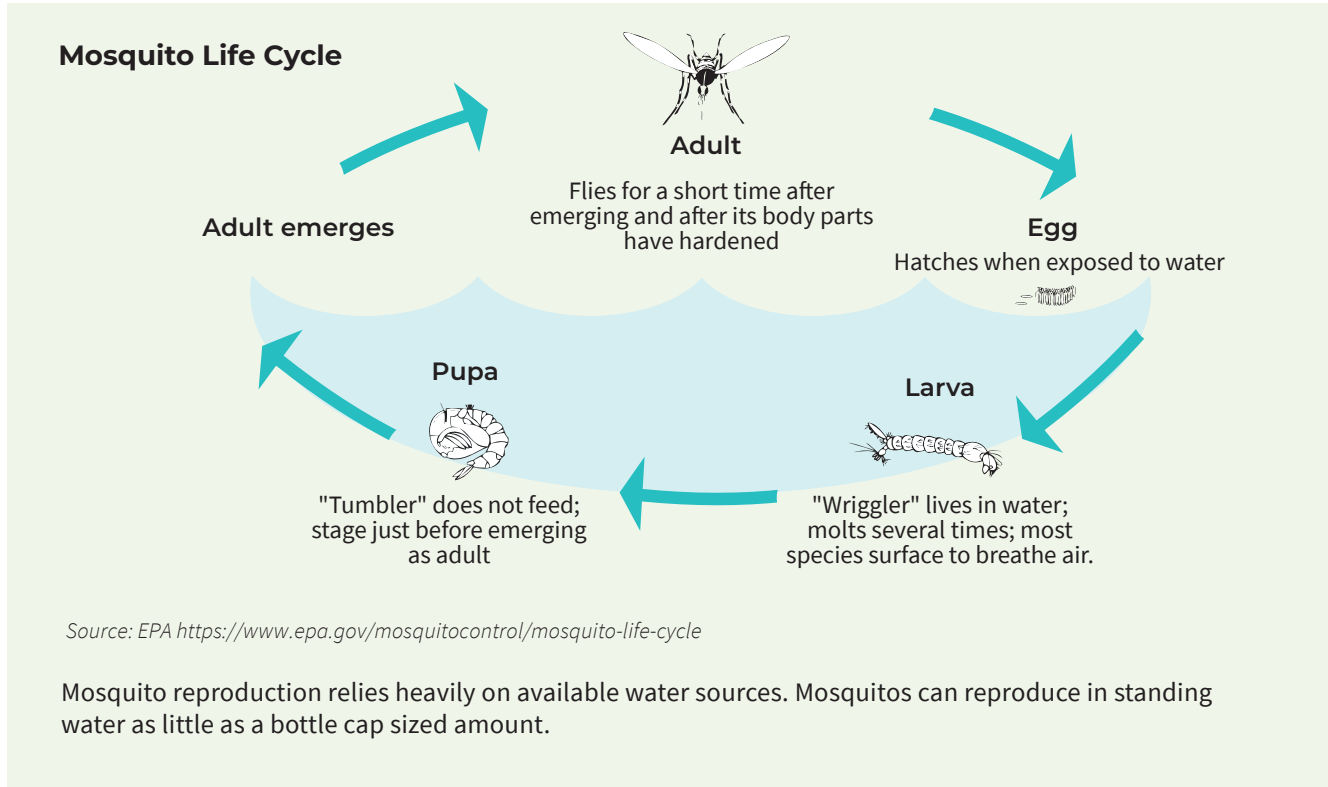
The solutions proposed within offer ways to reduce exposure to mosquitos:

1. Strategies to repel mosquitos
2. Strategies to reduce the mosquito population

The desired outcome will vary based on the proposed solution. There will be no method to track or measure the rate of effectiveness of any solution proposed. Any mention of rates of effectiveness is sourced.

PART I. BACKGROUND

# Glossary



**AEDES AEGYPTI MOSQUITO**

Prominent species in Houston, characterized by distinct black and white markings. Carrier of dengue fever, yellow fever, and Zika. Active during the day, particularly early morning and dusk.

**LARVICIDE**

Pesticide treatment that targets larvae in its breeding habitat at the larval stage before they can mature into adult mosquitoes. The Health and Mosquito Committee proposes using **dunks** as a larvicide treatment.

**CULEX MOSQUITO**

Prominent species in Houston. Carrier of West Nile Virus (WNV). Active at night.

**VECTOR**

An organism, such as an insect, that transmits a disease.

**CHEMICAL FOGGING**

The airborne spraying of pesticides intended to kill mosquitos. The Health and Mosquito committee uses the terms **fogging** and **spraying** interchangeably.

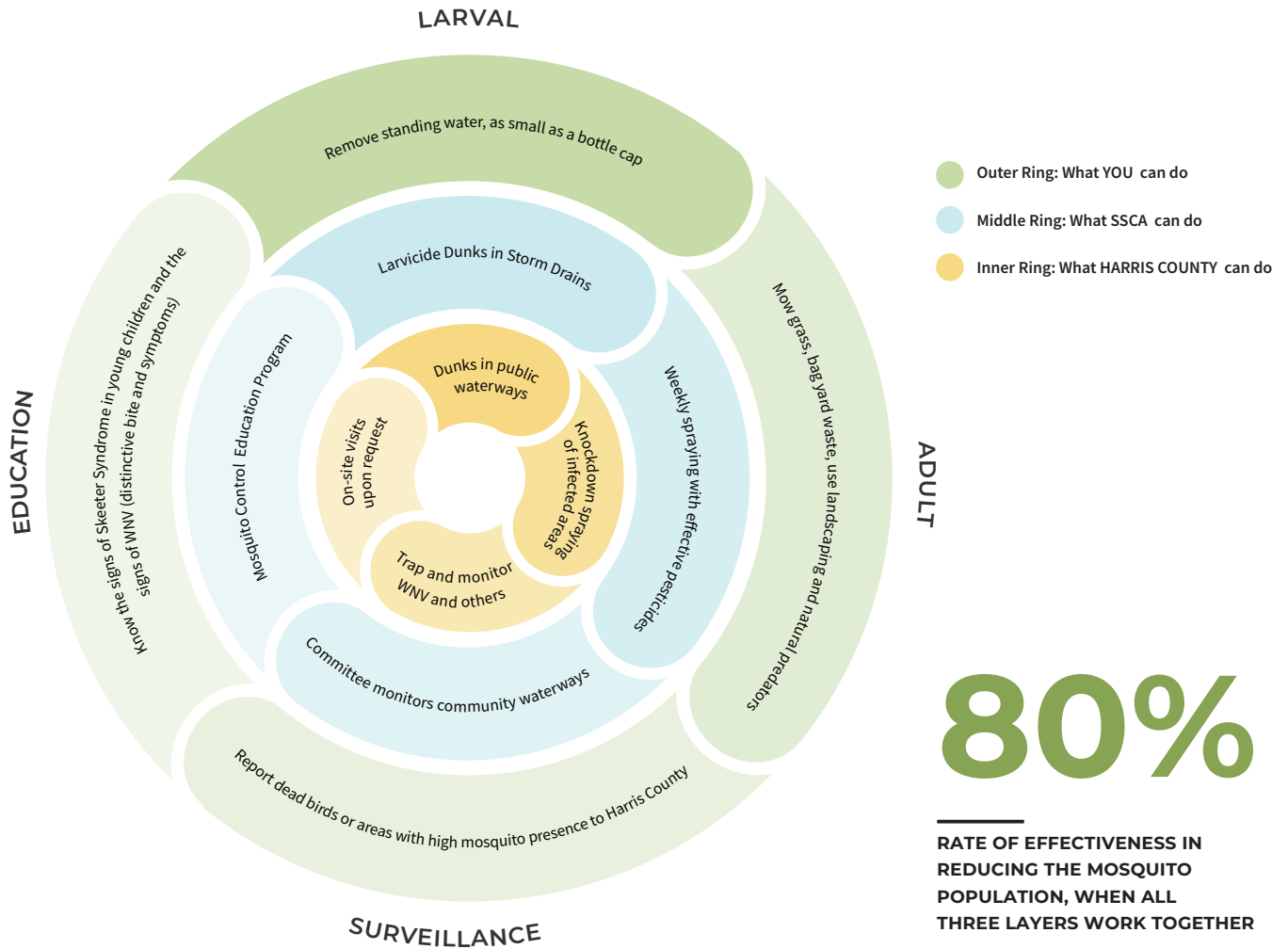
PART I. BACKGROUND

# Glossary

## INTEGRATED VECTOR MANAGEMENT

A process for the optimal use of resources for mosquito control. Several layers of responsibility are combined for a **proactive approach** to controlling the population at several stages. The chart below shows how we can combine the efforts of the **county, SSCA, and individual homeowner** to reduce the mosquito population by up to 80%.

If any layer is removed, or any stage is overlooked, this percentage decreases significantly.



PART I. BACKGROUND

# Member Feedback

**4 in 5**

**MEMBERS SUPPORT  
THE SSCA RESUMING FOGGING**



Of the members who have submitted an email to the office with an opinion about fogging, 84% support it  
Source: SSCA office personnel, as of 1/21/19



**IN FAVOR OF FOGGING**



**OPPOSED TO FOGGING**

“We walk our dog every evening, and this year has been absolutely the worst when it comes to mosquitoes. We have lived in Spring Shadows for 29 years. While I cannot definitively say the lack of spraying contributed to this year’s problem, it is too much of a coincidence to believe otherwise.”

**Alex Azzo**  
Lexford Ln.

“While this has been a polarizing topic it seems, I do believe you will find that ALL of those in Spring Shadows would prefer less/no mosquitoes comparatively. However, making a capital investment of this size and mandating all those open their pocket books for an option that has little/no evidence of effectiveness and not being able to ensure the safety of our families is not an option we should establish.”

**SSCA Member**

*Email excerpts used with permission*

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# **PART II. PROPOSAL**



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## PART II. PROPOSAL

# Recommendations to Board

*The Health and Mosquito committee requests the approval of the Board of Directors (BOD) for the following.*

## 01

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### COMMERCIAL GRADE LARVICIDE CONTRACT

The Health and Mosquito committee requests the approval of the Board of Directors (BOD) to seek a contract for the **monthly placement of commercial grade larvicide in the 206 storm drains** in the Spring Shadows neighborhood. This contract would begin in **March 2019 and run through October 2019**. The estimated cost of this service would be **\$600.00 per month** and would be provided by a licensed pest control company. This committee would present this contract to the BOD for final approval at the February 2019 BOD meeting. Information on the larvicide to be used can be found on the EPA website: <https://www.epa.gov/mosquitocontrol/bti-mosquito-control>.

## 02

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### MOSQUITO CONTROL EDUCATION PROGRAM

This committee also requests the approval of the BOD to create a Mosquito Control Education Program to **increase homeowner participation in mosquito control practices on their property**. An overview of this program is included.

## 03

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### CHEMICAL FOGGING CONSIDERATION

We also request that the BOD consider **whether or not** to include the addition of **regular chemical fogging** to this mosquito control program. Attached here are arguments for and against the inclusion of chemical fogging.

If the BOD approves the inclusion of fogging, the committee requests that BOD consider one of the two following options:

1. Weekly fogging to start in April 2019 and run through October 2019. This will be a 32 week program.
2. Fogging to be done on an as-needed basis as determined by the committee. This option would allow the committee flexibility to start and stop fogging activity based on factors such as the effectiveness of larvicide applications, weather conditions, and county mosquito control discovered disease activity. An attached document lists criteria the committee has discussed to use as a guide for defining as-needed fogging activity.

For either option above it is estimated to cost **\$270.00 per application** and will be provided by a licensed pest control contractor. Fogging will be done using EPA approved chemicals and a rotation schedule using two chemicals will be used to reduce the introduction of chemical resistance. Fogging will be done as close as possible to the **optimal effective times of dawn and dusk** taking into consideration weather conditions and residence activities. Residents will have the option of having their house skipped by the fogging contractor by providing the committee their address. These addresses will be provided to the contractor and maintained by the committee.

**The committee does not specifically endorse any one fogging solution.**

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## PART II. PROPOSAL

# Mosquito Control Education Program

## 01. INFORMATION DISTRIBUTION — INFO SHEET

- E-mail to residents
  - Post on official SSCA website, and official SSCA Facebook page (can then be shared on FB neighborhood page)
  - In each Newscaster, include an “Mosquito Prevention Corner” where we can review 1 or 2 issues/prevention measures, and answer commonly asked questions
  - Include Harris County contact information for reference
- 

## 02. HOME-OWNER CHECKLIST

- Include items to “check off” as they assess yards/homes themselves (removing standing water, standing water in French drains, window screens intact, etc)
  - Also share on the website in PDF format to be printed at home, and will have available to distribute to neighbors during door-to-door visits
- 

## 03. DOOR-TO-DOOR FOLLOW-UP AT START OF MOSQUITO SEASON (? and mid-way through)

- Address resident questions
  - Provide Harris County’s Vector Control phone number for yard assessments
  - To be completed by members of the committee and volunteers from the BOD/other neighbors
- 

## 04. MOSQUITO COMMITTEE MEMBERS ASSIGNED “RESPONSIBILITY AREAS” (BASED ON WHERE EACH LIVES)

- To be responsible for monitoring standing water, stagnant water in ditches and contacting Harris County for treatment (and recording in SSCA shared spreadsheet)

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**PART II. PROPOSAL**

# Mosquito Control Education Program

## **05. PRESENCE AT SPRING FESTIVAL (APRIL/MAY) AND THE GENERAL MEETINGS (NEXT IN APRIL)**

- Table at Spring Fest with exhibits/samples regarding:
  - On mosquito preventions, mosquito and yard education
  - Flower box/small pots with naturally mosquito repelling plants (ie catnip)
  - Free samples of dunks? (though will be sure to include safety information/warnings provided with dunk packaging information)
  - Mosquito games: “Whack-a-mosquito”
  - Homeowner Mosquito Prevention Checklists available to distribute

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## **06. OFFICIAL SSCA FACEBOOK MONTHLY REMINDERS/NEWS** (THAT CAN THEN BE SHARED ON THE NEIGHBORHOOD FACEBOOK PAGE)

- Include reminders to empty standing water, other friendly reminders, etc.
- Pertinent news articles, updates

## PART II. PROPOSAL

## Solution 01: Weekly Fogging

*A proactive approach*

## SNAPSHOT

**FREQUENCY OF FOGGING :** Weekly from April - October**ESTIMATE REDUCTION OF MOSQUITO POPULATION :** Up to 95.5% in the front yard.<sup>1</sup>  
Up to 49% in the backyard.<sup>2,3</sup>**PROS :** Safe for humans, pets, and beneficial insects. Highly effective. Necessary.**CONS :** Potential for eventual mosquito chemical resistance. Limited backyard effectiveness. Personal concerns about perceived health effects.**COST TO SSCA :** Estimated to be \$8,640.00 for the April - October season. This is on par with the historical cost of less than \$4.00/SSCA home per year.**WHAT ARE WE FOGGING AND HOW IS IT APPLIED?**

Permethrin: an insecticide in the pyrethroid family. It is synthesized from the chrysanthemum flower.

**How is Permethrin sprayed?**

Permethrin is sprayed from a motor attached to a truck. The motor pushes out a superfine mist, called Ultra Low Velocity (ULV) spray. The mist is composed of millions of tiny droplets, smaller than the width of the human hair<sup>4</sup>.

**What is the dosage of the spray?**

The amount of Permethrin in the fog is the equivalent to applying a Tylenol in a football field. This is a very small amount! The mist that is seen is the chemical mixed with either water or mineral oil, to help the Permethrin to stay in the air long enough to kill the mosquitoes<sup>5</sup>.

**How long is the mist in the air?**

The mist is in the air for approximately 15 minutes to an hour.<sup>6</sup>

**MOSQUITO FOGGING IS SAFE****Mosquito fogging is safe for humans and pets.**

- Permethrin does not absorb well on the skin of humans or pets<sup>7</sup>. It is so safe that it's used in flea & lice shampoos!
- The amount of permethrin in the mosquito spray is so small that it is not a concern for humans and pets.<sup>8</sup>

**Mosquito fogging is safe for beneficial insects (butterflies, honeybees, lizards).**

- We spray after dusk, when other insects are dormant.
- A 2017 study found that the EXACT chemical that our neighborhood sprays does not impact honeybees<sup>9</sup>.
- Scientists have found that flying insects that are larger than a mosquito are NOT harmed by permethrin.<sup>10</sup>

## PART II. PROPOSAL

# Solution 01: Weekly Fogging

*A proactive approach*

### MOSQUITO FOGGING IS EFFECTIVE

#### **Mosquito fogging is effective even when sprayed at night.**

A study in 2012 found that fogging at night is effective.<sup>11</sup> Though this is not necessarily the most ideal time to spray, it is the best time to spray because people, pets, and beneficial insects aren't out.

#### **Mosquito fogging is especially effective in the front yard.**

A study in 2012 found that 95.5% of mosquitoes in the front yard were killed.<sup>12</sup>

#### **Mosquito fogging is partially effective in the back yard.**

- A study in 2012 found that 49% of mosquitoes in the backyard were killed.<sup>13</sup>
- Another study found that 29-34% of mosquitoes in the backyard were killed.<sup>14</sup>

### MOSQUITO FOGGING IS NECESSARY

#### **Mosquito fogging reduces your risk of West Nile Virus.**

- According to the Texas Department of Health and Human Services,<sup>15</sup> so far this year there have been 120 cases of West Nile and 2 deaths from West Nile in the state of Texas. Of those, 28 cases have been reported in Harris County.
- 1009 West Nile Virus Positive mosquito pools have been reported in Texas. Harris County reported 310 West Nile Virus Positive mosquito pools. This is 31% of all of the infected mosquito pools in the entire state.

#### **Other mosquito borne diseases are on the rise in Texas.**

According to the Texas Dept of Health and Human Services, so far this year in Texas there have been<sup>16</sup>:

- 7 human cases of Chickungunya
- 3 human cases of Zika
- 12 human cases of Dengue, including 3 people in Harris County
- 2 mosquito pools that tested positive for St. Louis Encephalitis

By controlling the mosquito population, we reduce our risk of outbreak.

### MOSQUITO FOGGING IS AFFORDABLE

#### **In the past, the cost for mosquito fogging to the Spring Shadows Association was only \$3.94 a house.**

Other nearby neighborhoods charge between \$10 and \$25 a house for neighborhood fogging, and a private contractor for individual home fogging costs far more than that!

#### **Mosquito fogging will not cause dues to increase.**

Mosquito fogging has been accounted for in the 2019 SSCA budget and there will be no dues increase.

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## PART II. PROPOSAL

# Solution 01: Weekly Fogging

*A proactive approach*

## SOURCES

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- <sup>1</sup> Farajollahi A, Healy SP, Unlu I, Gaugler R, Fonseca DM (2012) Effectiveness of Ultra-Low Volume Nighttime Applications of an Adulticide against Diurnal *Aedes albopictus*, a Critical Vector of Dengue and Chikungunya Viruses. PLOS ONE 7(11): e49181. <https://doi.org/10.1371/journal.pone.0049181>
- <sup>2</sup> Ibid.
- <sup>3</sup> Barber JA, Greer M, Coughlin J. Field tests of malathion and permethrin applied via a truck-mounted cold fogger to both open and vegetated habitats. J Am Mosq Control Assoc. 2007 Mar;23(1):55-9.
- <sup>4</sup> Presentation by Harris County Public Health Vector Control to the Spring Shadows Civic Association Mosquito Committee. Presentation by Harris County Public Health Vector Control to the Spring Shadows Civic Association Mosquito Committee. September 2018. ii Ibid.
- <sup>5</sup> Ibid.
- <sup>6</sup> Ibid.
- <sup>7</sup> Peterson RK, Macedo PA, Davis RS. A human-health risk assessment for West Nile virus and insecticides used in mosquito management. Environ Health Perspect. 2005;114(3):366-72.
- <sup>8</sup> Preftakes CJ, Schleier JJ, Peterson RK. Bystander exposure to ultra-low-volume insecticide applications used for adult mosquito management. Int J Environ Res Public Health. 2011;8(6):2142-52.
- <sup>9</sup> Rinkevich, F., Margotta, J., Pokhrel, V., Walker, T., Vaeth, R., Hoffman, W., . . . Healy, K. (2017). Limited impacts of truck-based ultra-low-volume applications of mosquito adulticides on mortality in honey bees (*Apis mellifera*). Bulletin of Entomological Research, 107(6), 724-733. doi:10.1017/S0007485317000347
- <sup>10</sup> Schleier, Jerome & K D Peterson, Robert. (2010). Toxicity and risk of permethrin and naled to non-target insects after adult mosquito management. Ecotoxicology (London, England). 19. 1140-6. 10.1007/s10646-010-0497-9.
- <sup>11</sup> Farajollahi A, Healy SP, Unlu I, Gaugler R, Fonseca DM (2012) Effectiveness of Ultra-Low Volume Nighttime Applications of an Adulticide against Diurnal *Aedes albopictus*, a Critical Vector of Dengue and Chikungunya Viruses. PLOS ONE 7(11): e49181. <https://doi.org/10.1371/journal.pone.0049181>
- <sup>12</sup> Ibid.
- <sup>13</sup> Ibid.
- <sup>14</sup> 1: Barber JA, Greer M, Coughlin J. Field tests of malathion and permethrin applied via a truck-mounted cold fogger to both open and vegetated habitats. J Am Mosq Control Assoc. 2007 Mar;23(1):55-9.
- <sup>15</sup> DSHS Arbovirus Weekly Activity Reports Texas Department of State Health Services - <http://dshs.texas.gov/idcu/disease/arboviral/westNile/reports/weekly/>
- <sup>16</sup> NB: This information was obtained from the Texas Department of State Health Services

PART II. PROPOSAL

# Solution 02: Triggered Fogging

SNAPSHOT

**FREQUENCY OF FOGGING :** On a selective as-needed basis

**ESTIMATE REDUCTION OF MOSQUITO POPULATION :** Unknown % in both front and back yards

**PROS :** Save money. Less chemicals in the air. Public opinion perceives it as a compromise.

**CONS :** Reactive approach to mosquito population control. Scientific data does not support this approach.

**COST TO SSCA :** Amount for the season is unknown. Estimated to be \$270.00 per application.

Some on the committee feel that if fogging is to be included in the mosquito control program it should be dictated by events that significantly increase mosquito populations or the discovery of diseased populations in our area.

The following table of events and durations are proposed as triggers for a chemical fogging.

AS NEEDED FOGGING CRITERIA

EVENT	DURATION
● One week of daily rainfall	Until two weeks of no rain
● Rain event measuring 10+ inches	Until two weeks of no rain
● Discovery of diseased population	Three weeks

*The diseased population event would be defined as a Harris County Public Health Mosquito Control confirmed mosquito-borne disease activity in any one of the three operational areas that cover Spring Shadows.*

PART II. PROPOSAL

# Problems With Solution 02

## Challenges to Triggered Fogging

### CONS TO FOGGING ON A SELECTIVE BASIS

#### Reactive, not proactive approach to mosquito population control

World Health Organization recommends proactive spraying, not reactive spraying during emergencies only: “Previously successful control programmes were replaced by the reactive space spraying of insecticides during emergencies, a measure with high visibility and political appeal but low impact unless integrated with other control strategies.” The effectiveness of occasional spraying is unknown.

#### Concerns about what constitutes a “need” for an “as needed” basis - fogging is at who’s discretion?

“As needed” is always subjective, by its own definition. Think of your prescriptions. “As needed” would vary from person to person based on a combination of subjective and objective factors. We can never make this solution truly objective if decisions to fog are on a case by case basis.

#### Limited communication capabilities to alert the association of fogging events

As of now, SSCA has no quick and efficient way to communicate with the entire neighborhood. We do not have a valid email address for every home. For those we do have, we allow one email address per household. This option introduces challenges related to managing the expectations of the association. How will people know when we are or are not going to spray?

#### It is not a compromise for fogging vs. not fogging

The members in SSCA who are opposed to fogging have concerns about safety and want to reduce the chemicals sprayed in the air within our neighborhood. **This solution does not do that.** (See chart below). The members in SSCA who are in favor of fogging want a proactive approach proven to reduce the mosquito population. **This solution does not do that.**

#### Creating a solid criteria or guideline to spray does not seem to reduce spray weeks most years.

Backtesting the criteria for the Triggered Fogging rainfall qualifications





## PART II. PROPOSAL

## Solution 03: No Fogging

*Sewer Dunks and Resident Education - yes*

## SNAPSHOT

**FREQUENCY OF FOGGING :** None

**ESTIMATE REDUCTION OF MOSQUITO POPULATION :** 0% in both front and back yards

**PROS :** Saves money. No chemicals in the air. Safe for humans, pets and beneficial insects. Personal concerns about health effects. Appeals to organic lifestyle preferences. Protects the food chain.

**CONS :** Allows mosquito population to grow unchecked within Spring Shadows. Scientific data does not support this approach. Increases risk of West Nile virus.

**COST TO SSCA :** \$0. No cost incurred.

## FOGGING IS THE LEAST EFFECTIVE METHOD OF MOSQUITO CONTROL:

- Per Harris County Public Health Mosquito Control: the #1 step they take is to control the birth of mosquitos by employing larvicide in sewer drains or other standing water sources. The County will only fog when a trapped mosquito tests positive; County will spray for 3 days and stop.
  - “WHO (World Health Organization) stresses that the elimination of mosquito breeding sites is the most effective intervention for protecting populations. Fogging, which is recommended for emergency situations only, is most effective when conducted in the hours around dawn and dusk, when mosquito activity is most intense.”<sup>1</sup>
- “Nearly all published studies of ULV efficacy are bio-assays based on the mortality of caged mosquitoes. In our study we preferred to monitor the direct impact of treatments on the wild mosquito populations.... Susceptibility to the insecticide was high but there was no discernable change in the oviposition rate or the catch of adult female mosquitoes, nor was there any change in the parous rate.”<sup>2</sup>
- “The reactive space spraying of insecticides during emergencies, a measure with high visibility and political appeal but low impact unless integrated with other control strategies.”<sup>3</sup>
- The EPA lists adulticide has the 4th of 4 steps to control mosquitos.<sup>4</sup>
- Mosquitos become resistant to the insecticides – pyrethroids. The same insecticides have been used since 1977.<sup>5</sup>

## PEOPLE CAN BE SENSITIVE TO THE CHEMICALS:

- “People who may be particularly sensitive to chemicals could possibly experience short-term effects, such as eye, skin, nose or throat irritation or breathing problems. Some pesticide residues may be present on outdoor surfaces after spraying.... All people, especially children and pregnant women should avoid exposure when practical.
  - If possible, remain inside or avoid the area whenever spraying takes place and for about 30 minutes after spraying. That time period will greatly reduce the likelihood of your breathing pesticide in air.
  - Close windows and doors, and turn off window air-conditioning units or close their vents to circulate indoor air before spraying begins. Windows and air-conditioner vents can be re-opened about 30 minutes after spraying. Managers of buildings with ventilation systems should shut off intake during spraying.”<sup>6</sup>

## PART II. PROPOSAL

# Solution 03: No Fogging

*Sewer Dunks and Resident Education - yes*

### LONG TERM EFFECTS:

- “They are an important link in the food chain. Many animals depend on them as a source of food. During their aquatic stage, mosquito larvae provide food for the other aquatic insects such as, dragonfly nymphs and beetles, fish, frogs and other water-dwelling animals.”<sup>7</sup>
- Chemicals kill or negatively affect what it touches. “Pyrethroids are toxic to fish and to bees.”<sup>8</sup>
- “Pyrethroids, like all toxins, are indiscriminate: they affect all the organisms who come into contact with them in the air, on plants, on the ground, in the soil, and in the water”<sup>9</sup>

### THERE ARE BETTER ALTERNATIVES FOR MOSQUITO CONTROL:

- Implement commercial-grade sewer dunks in all storm drains
- Fogging by SSCA only affects the street and  $\frac{1}{3}$  –  $\frac{1}{2}$  of the front yard leaving the remaining property & public areas untreated for mosquitos. For a holistic approach, all Homeowners are encouraged to be proactive:
  - Refer to “steps homeowner’s can take” education guide published by the SSCA Mosquito Committee
  - <http://publichealth.harriscountytexas.gov/Portals/27/Documents/Resources/Mosquito/FighttheBiteJuly2012.pdf?ver=2016-06-17-103620-953>
- “Botanicals can also be used as reducing and capping agents for the rapid synthesis of mosquitocidal nanoformulations, and can even be employed to prepare cheap repellents with low human toxicity”<sup>10</sup>

## SOURCES

<sup>1</sup> <http://www.who.int/emergencies/zika-virus/articles/mosquito-control/en/>

<sup>2</sup> <https://parasitesandvectors.biomedcentral.com/articles/10.1186/s13071-016-1881-y>

<sup>3</sup> <http://www.who.int/emergencies/zika-virus/articles/mosquito-control/en/>

<sup>4</sup> <https://www.epa.gov/mosquitocontrol/success-mosquito-control-integrated-approach>

<sup>5</sup> <https://www.sciencemag.org/news/2016/10/after-40-years-most-important-weapon-against-mosquitoes-may-be-failing>

<sup>6</sup> <http://www.health.ri.gov/disease/carriers/mosquitoes/about/spraying/>

<sup>7</sup> <http://www.cityofchesapeake.net/Page2972.aspx>

<sup>8</sup> <https://www.epa.gov/mosquitocontrol/permethrin-resmethrin-d-phenothrin-sumithrinr-synthetic-pyrethroids-mosquito-control>

<sup>9</sup> <http://www.anapsid.org/pyrethroids.html>

<sup>10</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5198200/>

## PART II. PROPOSAL

## Problems With Solution 03

*Challenges to No Fogging*

## A REVIEW OF SOURCES PROVIDED IN THE NO FOGGING SOLUTION PROPOSAL

1. Harris County did not say that larvicide is their first step. The Field Operation Manager said that larvicide is “efficient” but that “once you have mosquitoes on the wing, the larvae aren’t the ones that have the virus.” **Harris County’s primary concern is reactive vector control, therefore adulticide is their primary means of mosquito control.** If you have documentation that supports your claim that larvicide is Harris County’s “#1 step”, then include a link to your source.
2. The quotation from the WHO article **includes emphasis that is not in the original article.**
3. “Nearly all published studies of ULV efficacy...”— this study in Nice, France was looking at the chemical deltamethrin. **This is not a chemical we are considering.** Do you have peer-reviewed documentation that concerns the chemicals that we are actually proposing to employ?
4. “reactive space spraying” quotation— I notice that you have cherry picked this quotation out of context. Here is the sentence in its entirety: “Previously successful control programmes were replaced by the reactive space spraying of insecticides during emergencies, a measure with high visibility and political appeal but low impact unless integrated with other control strategies.” **If you place this sentence in the context of the article, it states that proactive spraying, as part of an integrated mosquito control program, is far superior to the reactive spraying of, say, an “as needed” basis.** However, this doesn’t support your thesis of “no fogging”, unfortunately.
5. “The EPA lists adulticide...”— Well, it is factually true that it is listed fourth. However, **you are trying to imply that it is #4 because spraying is not a preferred option by the EPA. This is patently false.** This article that you cite, but do not quote from, describes spraying as “one of the fastest and best options”: “Using an EPA-registered pesticide is one of the fastest and best options to combat an outbreak of mosquito-borne disease being transmitted by adult mosquitoes.” <https://www.epa.gov/mosquitocontrol/success-mosquito-control-integrated-approach>
6. “Mosquitoes become resistant to the pyrethroids”— First, you are citing a magazine article, not a peer reviewed journal. Second, while it is true that resistance to insecticides is a possibility, Harris County published a study last year in 2017 in **The Journal of Vector Ecology that demonstrated that our local mosquitoes do not currently indicate any levels of resistance.** Here is a link to their study: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/jvec.12268>
7. “People who may be particularly sensitive...”— Again, this is not from a peer reviewed journal. Rhode Island is very different from Houston. Here is what the CDC says about truck spraying safety: “What should I do during or after spraying? Spraying is safe. **You do not need to leave an area when truck spraying for mosquito control takes place.** If you prefer to stay inside and close windows and doors when spraying takes place you can, but it is not necessary. If you are having any type of health problems after spraying, contact your doctor or healthcare provider. The spray does not harm pets, but you may choose to bring them inside when spraying occurs.” <https://www.cdc.gov/zika/pdfs/TruckMounted-FactSheet.pdf>
8. “They are an important link in the food chain”— Again, more information from a website, **not a peer reviewed academic study.**
9. “Pyrethroids are toxic...”— Again, this is a statement out of context. Here is the full quotation: “When applied according to label directions, **pyrethroids used in mosquito control programs do not pose unreasonable risks to wildlife or the environment.** Pyrethroids are low in toxicity to mammals and are practically nontoxic to birds. However, pyrethroids are toxic to fish and to bees.” (My emphasis added). Furthermore, **different pyrethroids have different levels of toxicity.** For instance, the pyrethroid resmethrin (which we are not considering even though ABC tried to propose it) has indeed been found to have high levels of toxicity to fish and bees. Do you have a peer-reviewed source that addresses the fish and bee toxicity of permethrin?

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## PART II. PROPOSAL

# Problems With Solution 03

### *Challenges to No Fogging*

10. “Pyrethroids, like all toxins, are indiscriminate...”— Again, this is a blog, **not a peer reviewed article**. The author describes herself as an “animal welfarist” and states that she is “self taught” and writes from a “personal point of view”. Replace with a peer-reviewed source or remove.
11. “Implement commercial grade dunks...”— What is your peer-reviewed source for dunks as a preferred alternative to spraying?
12. “Fogging in Spring Shadows only effects the Street...”— What is the source for your claim of the limited efficiency of spraying? A peer reviewed study?
13. “botanicals can also be used as reducing and capping agents”— Within the context of the article, they are discussing the use of plants as an unknown agent of mosquito control. The author states that this is a new development and is, as yet, untested. The botanicals referred to here are plant elements that have been broken down into nanoparticles. **This technology is not available to the public, so it does not make sense to recommend it to the neighborhood.**

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## **PART III. SUPPORT**

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# Additional Data

### SUPPORTING INFORMATION AVAILABLE ON SSCA WEBSITE

Head to <https://springshadows.org> for the following additional info:

- Director Frequently Asked Questions (FAQ)
- Safety Data Sheets (SDS) for proposed pesticides. These pertain to the direct handling of the concentrated agents — homeowners would not incur risks due to professional handling by the chosen contractor.